Serial No.	Questions	CO	Bloom's Taxonomy Level	Difficulty Level	Competitive Exam Question Y/N	Area	Topic	Unit	Marks
1	Define Binary Operations.	CO4	K1	Low	N			4	2
2	Define Internal Binary Operations.	CO4	K1	Low	N			4	2
3	Define External Binary Operations.	CO4	K2	Medium	N			4	2
4	Define Group.	CO5	K2	Medium	N			4	2
5	Define Sub-Group of a Group.	CO5	K1	Medium	N			4	2
6	Define order of Group and Order of an element of Group.	CO4	K2	Low	N			4	2
7	Define Normal subgroup.	CO5	K2	Medium	N			4	2
8	Define Abelian Group.	CO5	K1	Low	N			4	2
9	Define Group Homomorphism.	CO4	K2	Low	N			4	2
10	Define product of two permutations on n symbols. Explain it by an example on 5 symbols.	CO4	K2	Medium	N			4	2
11	Define i) a cycle ii) a transposition.	CO4	K2	Low	N			4	2
12	Define disjoint cycles with help of an example.	CO4	K1	Medium	N			4	2
13	Let $a, b \epsilon (G,*)$, where G is a Group. Show that $(a * b)^{-1} = b^{-1}a^{-1}$.	CO4	K2	Medium	N			4	2

14	Let $C_1 = (2\ 3\ 7)$, and $C_2 = (1\ 4\ 3\ 2)$be cycles in S_8. Find C_1C_2 and express it as product of transpositions.	CO4	K2	High	N			4	2
15	Define i) a permutation, ii) a symmetric group.	CO5	K2	High	N			4	2
16	Give an example of a semi-group which is not a group.	CO4	K2	Medium	Y			4	2
17	Define inverse of a permutations. IF $\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 3 & 1 & 4 & 4 & 2 & 7 & 6 \end{pmatrix} \in S_7$ then find σ^{-1}.	CO4	K2	Medium	Y			4	2
18	Let $\alpha = (1\ 3\ 2\ 5)(1\ 4\ 3)(2\ 5) \epsilon S_5$, Find α^{-1} and express it as a product of disjoint cycles. State whether $\alpha^{-1} \in S_5$.	CO4	K2	Medium	N			4	6
19	Define Even & Odd permutations. Show that order of Odd permutation is Even.	CO4	K2	Medium	N			4	6
20	Show that every subgroup of an Abelian/Cyclic group is Normal.	CO4	K2	Medium	N			4	6
21	Show that in any Group $(G,*)$, Identity and inverse of any element is unique.	CO4	K2	Medium	N			4	6
22	Show that Quotient group of an Abelian group is Abelain.	CO4	K3	High	Y			4	6
23	Define Quotient group and give one example.	CO5	K3	Medium	Y			4	6
24	Sate and Prove Lagrange theorem.	CO4	K3	Medium	Y			4	6
25	Define Field with the help of an example.	CO5	K3	Medium	Y			4	6
26	Define Ring with the help of an example.	CO5	K3	Medium	Y			4	6
27	Define Integral Domain with the help of an example.	CO5	K2	Medium	Y			4	6
28	Consider the set $\mathbb{Q}$ of rational numbers, and let $*$ be the operation on $\mathbb{Q}$ defined by	CO4	K2	Mediu	Y			4	6

	$a * b = a + b - ab$ (a) Find $3 * 4$, $2 * (-5)$ and $7 * 1/2$. (b) Is $(\mathbb{Q},*)$ a semigroup? Is it commutative? (c) Find the identity element for $*$.			m					
29	In a group $G = (A, *)$. Show that if $a^2 = e$ for all a in a group G, then G is commutative.	CO4	K2	Me diu m	N			4	6
30	Let $a * H$ and $b * H$ be two cosets of H. Then either $a * H$ and $b * H$ are disjoint or they are identical.	CO4	K3	Hi gh	N			4	6
31	Suppose $a^2 = a$ for every $a \in R$. (Such a ring is called a *Boolean* ring). Prove that R is commutative.	CO4	K3	Hi gh	N			4	6
32	State and prove that Lagrange's theorem . Let G be a group of order p, where p is a prime. Find all subgroups of G.	CO4	K3	Hi gh	N			4	6
33	Show that the composition of homomorphism is a homomorphism.	CO4	K3	Hi gh	N			4	6
34	Show that inverse of a bijective homomorphism from $G \rightarrow \bar{G}$, is an homomorphism from $\bar{G} \rightarrow G$..	CO5	K3	Hi gh	N			4	6
35	Show that in a ring R: (a) $(-a)(-b) = ab$; (b) $(-1)(-1) = 1$, if R has an identity element 1.	CO4	K3	Hi gh	N			4	6
36	Show that set of cubic roots of unity is a Group under multiplication.	CO4	K3	Hi gh	N			4	6
37	Show that in a Ring $\boldsymbol{R}$ with identity element 0 and unity element 1, $\forall a \in R, a.0 = 0 = 0.a$.	CO4	K3	Me diu m	Y			4	6
38	Show that $Z_5 = \{0,1,2,3,4\}$ is a Ring under addition and multiplication modulo 5.	CO5	K3	Me diu m	N			4	6
39	Let $(R, +, .)$ be a Ring with unity. Show that $\forall a \in R$, 1. $(-1).a = -a$ 2. $(-1).(-1) = 1$	CO4	K3	Me diu m	N			4	6
40		CO5	K3	Lo w	N			4	9
41		CO4	K3	Me diu m	N			4	9
42	Show that every field is an Integral Domain.	CO5	K3	Me diu m	N			4	9
43	Let Z_n denote the set of integers {0,1,2,...,n-1}.	CO4	K3	Hi gh	N			4	9

	Let $*$ be binary operation on Z_n such that $a * b =$ the remainder of ab divided by n a) Construct the table for the operation $*$ for n=7. b) Show that $(Z_n, *)$ is a semi-group for any n.								
44	Consider the Group $G = \{1,2,3,4,5,6\}$ under multiplication modulo 7. (a) Find the multiplication table of G. (b) Find $2^{-1}, 3^{-1}, 6^{-1}$.	CO4	K3	High	N			4	9
45	Consider the ring $Z_{10} = \{0, 1, 2, \ldots, 9\}$ of integers modulo 10. (a) Find the units of Z_{10}. (b) Find -3, -8, and 3^{-1}.	CO4	K3	High	N			4	9
46	Prove that $F = \{a + b\sqrt{2} \mid a, b \text{ rational}\}$ is a field.	CO5	K3	High	Y			4	9
47	Prove that $F =\{ a + b\sqrt{2}2 \mid a, b \text{ integers}\}$ is an integral domain but not a field.	CO5	K3	High	N			4	9
48	Show that $F = \{a + ib: a, b \ are\ rational\ numbers\}$ is a Field under usual addition and multiplication.	CO5	K3	Medium	N			4	9
49	Show that Z_7 is a field under addition and multiplication modulo 7.	CO5	K3	Medium	Y			4	9
50	Show that $R = \{0,2,4,6,8\}$ is an integral Domain under addition and multiplication modulo 10.	CO5	K3	High	N			4	9

Signature of Course co-ordinator:

Signature of PC:

Signature of Dean:

IQAC:

Appendix II :

Bloom’s Taxonomy Levels Distribution of Questions in Question Bank

School of SBAS

Course Name : Linear Algerba and differential Equations Course Code : MATH1006

Serial No.	Bloom’s Taxonomy Level	Percentage Distribution
1	Knowledge	10%
2	Understand	30%
3	Apply	60%

Signature of Course co-ordinator:

Signature of PC:

Signature of Dean:

IQAC:

Appendix III :

Bloom’s Taxonomy Levels Distribution of Questions in Question Bank

School of SBAS

Course Name : Linear Algerba and differential Equations Course Code : MATH1006

Serial No.	Difficulty Level	Percentage Distribution
1	Low	20%
2	Medium	60%
3	High	20%

Signature of Course co-ordinator:

Signature of PC:

Signature of Dean:

IQAC: